

2-1

Finding the Mean

Check Skills You'll Need

Long-Division Review
dividing, the other than remainder is

quotient.

12

5

÷ 4

For Help
Lesson 1-9

What You'll Learn

To find and analyze the mean of a data set using models and calculations

New Vocabulary mean, outlier

Why Learn This?

Meteorologists analyze data. They often use a measure, such as the mean, to help describe a set of data.

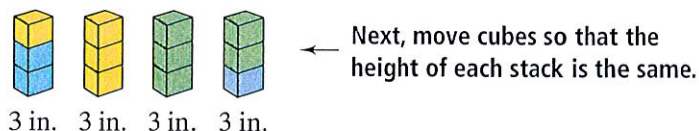
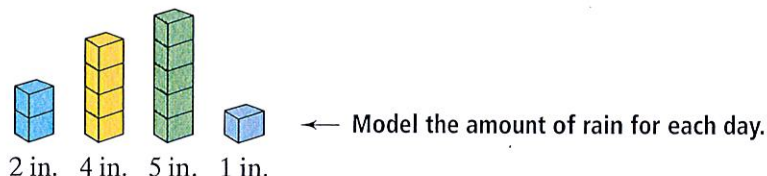
The **mean** of a set of data is the sum of the data divided by the number of data items. To find the mean of a set of data, you can adjust all of the values so the values are the same.



EXAMPLE Using a Model to Find the Mean

- On four days it rained 2 inches, 4 inches, 5 inches, and 1 inch. Find the mean amount of rain.

You can draw a picture or use objects to model the situation.



The mean amount of rain is 3 inches.

✓ Quick Check

- Use a model to find the mean of 3, 6, 3, 4, 2, and 6.



The thorny lizard survives high temperatures by using its spikes to collect moisture at night.

EXAMPLE Calculating the Mean

- 2 You measure the temperature outside each day during the week. The temperatures are 95° , 96° , 103° , 99° , and 96° . Find the mean temperature.

$$95 + 96 + 103 + 99 + 96 = 489 \quad \leftarrow \text{Add the temperatures.}$$

$$\frac{489}{5} = 97.8 \quad \leftarrow \text{Divide by the number of readings.}$$

The mean temperature is 97.8° .

Check for Reasonableness The mean is between the lowest value, 95, and the greatest value, 103. So, the answer 97.8 is reasonable.

Quick Check

2. You play a word game. Your scores are 12, 23, 13, 32, and 20. Find your mean score.

An **outlier** is a data item that is much greater or less than the other data items. If a data set has an outlier, then the mean may not describe the data very well.

EXAMPLE Analyzing the Mean

- 3 Your quiz scores in science are listed at the left. Find the mean score with and without the outlier. What effect does the outlier have on the mean?

Quiz Scores		
81	77	92
89	81	87
75	42	81

Since 42 is much less than the other scores, the outlier is 42. Find the mean with and without the outlier.

$$\text{With the outlier: } \frac{81 + 77 + 92 + 89 + 81 + 87 + 75 + 42 + 81}{9} \approx 78.333$$

$$\text{Without the outlier: } \frac{81 + 77 + 92 + 89 + 81 + 87 + 75 + 81}{8} = 82.875$$

The outlier reduced the mean quiz score by about 5 points.

Quick Check

3. You keep track of the number of hours you baby-sit for six days. The hours are 1.25, 1.50, 1.50, 1.75, 2.0, 5.5. What effect does the outlier have on the mean?

2-2

Median and Mode

Check Skills You'll Need

1. Vocabulary Review

To find the mean of 1, 2, 3, 4, and 5, you add the numbers and divide by ? .

Find the mean of each set of data.

2. 4, 16, 20, 40

3. 12, 23, 19, 32, 26

4. 5, 15, 75, 105, 85



What You'll Learn

To find and analyze the median and mode of a data set

New Vocabulary median, mode

Why Learn This?

Scientists use the mean, median, and mode to describe sets of data, including fish populations.

The **median** is the middle number in a set of ordered data. The median gives a good description of numerical data with outliers.



4 7 9 13 25

↑
median

For an even number of data items, you can find the median by adding the two middle numbers and dividing by 2.

EXAMPLE Finding the Median

Test Prep Tip

A griddable answer is not always a decimal.

		2	1
•	•	•	•
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9

- 1 Gridded Response** A biologist studying the ecology of a river makes a weekly fish count. The results are 19, 18, 22, 23, 20, 24, 23, 20, 34, and 19. Find the median number of fish.

18, 19, 19, 20, 20, 22, 23, 23, 24, 34 ← Order the data. Since there are items, use the two middle values.

$$\frac{20 + 22}{2} = \frac{42}{2}, \text{ or } 21 \quad \leftarrow \text{Find the mean of 20 and 22.}$$

The median number of fish is 21.

Quick Check

1. Weekly sales of comics at a store are 39, 19, 28, 9, 32, 35, and 17 comics. What is the median number of comics sold?

The **mode** is the data item(s) that appears most often. A data set may have more than one mode. If all data items occur the same number of times, there is no mode. The mode is useful when the data items are repeated or not numerical.

EXAMPLE Finding the Mode

- 2 The list shows the favorite lunches of 15 students. Find the mode.

Group the data.

pizza, pizza, pizza, pizza, pizza
hamburger, hamburger, hamburger
taco, taco, taco, taco
spaghetti, spaghetti, spaghetti

Pizza occurs the most. It is the mode.

Favorite Lunch

hamburger, pizza, taco,
pizza, spaghetti, taco,
spaghetti, hamburger,
hamburger, pizza, taco,
pizza, pizza, spaghetti,
taco

Quick Check

2. How many students would have to switch from hamburger to taco as their favorite lunch for taco to be the only mode?

EXAMPLE Analyzing Data

- 3 Find the mean, median, and mode for the number of minutes spent on the Internet. Does the mean, median, or mode best describe the typical amount of time spent on the Internet?

Amount of Time Spent on Internet (minutes)

50	276	57	50
62	53	72	71
63	60	22	

$$\text{mean } \frac{50 + 276 + 57 + 50 + 62 + 53 + 72 + 71 + 63 + 60 + 22}{11} = \frac{836}{11}$$

$$= 76$$

median 22 50 50 53 57 60 62 63 71 72 276: 60

mode 50

The mode and mean are close to only a few data points. The median is close to most of the data items. So the median best describes the typical amount of time spent on the Internet.

Quick Check

3. The top five women's 1-meter diving scores are 288.75, 261.83, 254.85, 254.1, and 246.8. Does the mean, median, or mode best describe these data? Explain.